Nutrition News

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DIET IS AN IMPORTANT FACTOR IN THE PREVENTION AND CONTROL OF DENTAL CARIES

By LYDIA J. ROBERTS, Ph.D.
The University of Chicago

One of the most widely remarked evidences of faulty nutrition is the presence of dental defect. Although the relation of nutrition to the teeth is far from being wholly understood, it is now recognized that an unbalanced diet plays a major role in the development of abnormalities in teeth and jaws, including dental decay, irregular and misshapen teeth, malocclusion, and pyorrhea.

The theories of the mode of action of diet in the production of dental caries fall into two main classes which may be briefly characterized as the external and internal theories. The external theory is the oldest and is probably the one still held by most dentists. This theory maintains that bacteria in the presence of carbohydrate set up a fermentative process with the production of acid which dissolves the enamel of the tooth and initiates the carious process. Diet may favor this effect both by supplying easily fermentable carbohydrates, and/or by determining the nature of the saliva or other conditions favoring the presence of aciduric organisms. One of the chief supports of this theory is the fact that caries develops in localities where stagnation of food may readily occur—for example, between teeth and in pits and crevices—and rarely on smooth surfaces that are easily cleansed by saliva, fibrous foods, or the tooth brush.

The internal or systemic theory, on the other hand, holds that dietary action in dental defect is by way of the bloodstream. This action is explained in two chief ways. According to the first, a tooth—including the enamel—is a living metabolizing organ like other body structures and like them

Doctor Roberts

therefore requires a constant supply of all materials needed for its maintenance and repair. A diet lacking in any needed dietary factors, then, would cause a depletion of the tooth structure and render it susceptible to decay. Against this, of course, is argued the claim that caries always develops from the outside. By the second systemic theory, the diet is held to act by determining the composition and reaction of the saliva in which the tooth bathes.

No matter what theory of the mode of action is held, however, practically all workers agree that a good diet goes a long way toward the prevention of dental decay. The diet arrived at in all cases is essentially the same, namely, one which contains optimum amounts of all dietary constituents, and which is low in sugars and potentially alkaline in its reaction. Translated into terms of the American dietary, this means liberal amounts of milk and

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Food MAKES THE DIFFERENCE

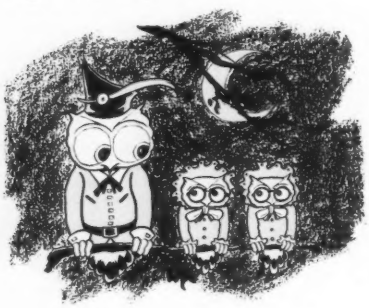
A TRUE STORY

Certain ailments known for generations among different racial groups have now been identified as dietary deficiency diseases. Studies of the food habits of such peoples provide us with practical nutrition lessons.

On the northeast coast of Canada is a narrow strip of land called Labrador. The natives live in tiny, isolated villages located in coves along the rocky, barren coast. Fishing is almost their only occupation. With the "season's catch" they barter for their yearly food supply.

Let us examine a typical yearly consignment of food for a Labrador family: salt pork, margarine, white flour, molasses, sugar and tea. These foods, together with the fish they catch, make up the diet of these people throughout the long winter. And there is little relief from this monotonous fare for there are few gardens, few cows and chickens and a scarcity of native fruits and game.

In summer the men spend long hours fishing in the bright sunlight. When daylight begins to fade they hasten back to shore, for they have learned that often they cannot see in the twilight and there is danger of wrecking their boats on reefs. Failure to see in the dark after exposure to bright light is called night-blindness.



Can You See in the Dark?

Nutritional night-blindness, common in Labrador, is due to a deficiency of vitamin A in the diet. A glance at the foods which make up the Labrador diet is sufficient to see that the diet is devoid of this essential vitamin and that such vitamin A-rich foods as butter, whole milk and the products of milk, are not included.

To understand the function of vitamin A in preventing and curing night-blindness one must know how this condition develops. A substance in the eye called visual purple is being bleached continuously in the presence of any strong light. When a person is taking plenty of vitamin A the visual purple is also being regenerated rapidly. But when there is a shortage of vitamin A the regeneration process is slow and the person becomes night-blind.

These fisherfolk have known for generations the only cure for night-blindness available to them, i.e. eating the livers of birds and fish. Unfortunately the natives use the livers only in case of need—a practice perhaps due to the fact that they are unappetizing for daily consumption.

Vitamin A Effective

Night-blindness in Labrador with its vitamin A-deficient diet is easy to explain. But there is recent evidence to indicate that night-blindness is fairly common in our own country, where a vitamin A-rich diet is easily obtainable from our most palatable foods. This situation is particularly alarming in view of the fact that night-blindness, believed to be an early symptom of vitamin A deficiency, is often not recognized by the persons affected. We may therefore well ask, can you see in the dark? Can you adjust your vision quickly to the semi-darkness of a movie theatre after the bright lights of the lobby? Can you see the road ahead clearly after facing the glaring lights of the automobile you meet?

At the present time efforts are being made to perfect a device for detecting night-blindness. Until that is accomplished the only safe procedure is to choose, daily, adequate amounts of those protective foods known to be rich in vitamin A—the foods which form the bulwark of any satisfactory diet—dairy products, green and yellow vegetables and eggs.

glances AT NUTRITION RESEARCH

Conception of the optimum in contrast to the adequate diet is one of the most significant outcomes of nutrition research in recent years.

MILK CALCIUM

Depletion of the calcium stored in the bones may result from many causes; but regardless of the cause, the treatment recommended is increased ingestion of calcium and preferably in the form of milk. This information is contained in a series of articles recently prepared by the U. S. Pharmacopeial Committee of Revision and The Journal of the American Medical Association.

UTILIZATION PROBLEM

Recent evidence indicates that the plant pigment carotene, which is changed to vitamin A in the body, is not as well absorbed as vitamin A itself. The most recent work reported shows that the amount of carotene required to prevent night-blindness in farm animals is about four times the amount of vitamin A required for the same purpose. The superiority of animal over vegetable products as sources of vitamin A is indicated.

VITAMIN NEEDS

Optimum vitamin intakes for human beings have recently been suggested in terms of International Units. In all except vitamin D the requirements designated below are for adults: vitamin A, 300 units per 100 calories of food eaten (a total of 6 to 9 thousand units daily); vitamin B, 200 to 400 units daily; vitamin C, 2,000 units daily; vitamin D, 700 units (for infants) daily.

VITAMIN UNITS

Vitamin values are expressed in several denominations and it is necessary to know the relation of one unit to another in order to compare the vitamin values of foods.

Vitamin A—1 International (or U.S.P.) unit = 1.4 Sherman-Munsell units.

Vitamin B—1 International unit = 2 Sherman-Chase units.

Vitamin C—1 International unit = 0.10 Sherman-La Mer-Campbell unit.

Vitamin D—1 International (or U.S.P.) unit = 0.37 Steenbock unit.

A SCIENTIFIC STUDY

By Dr. Isaac Schour
College of Dentistry
University of Illinois

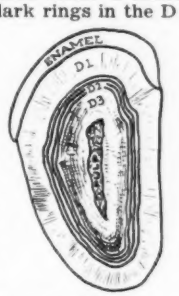
Teeth, like trees, carry records of their owner's growth and nutritional history in minute rings that are laid down at regular intervals. Nutritional disturbances are reflected in irregularities of these rings during the period of tooth development. Thus, in a sense, your teeth tell part of your life story and analysis of tooth rings offers a method of research in nutrition.

Tree rings are annual records of the nutrition of the tree, one ring forming every year. In man, tooth rings are spaced only four days apart and show in both enamel and dentin. Starting from the fourth month before birth, when teeth begin to form, and continuing until the sixteenth year of life, there is always one tooth or another which records what is going on in the body.

Study of Tooth Rings

Tooth rings are not visible to the naked eye but can be seen under the microscope. The significance of these tooth rings was clarified as a result of studies of mottled enamel made cooperatively by Dr. Margaret Cammack Smith of the University of Arizona and myself. Children who drink water containing a small amount of fluorine have badly mottled teeth, stained by the fluorine. In order to learn more about this condition we gave fluorine to rats either in the diet or by injection. The result was typical markings on the rat's teeth. The regularity of the markings interested us and led to the recognition and study of tooth rings.

The accompanying drawing shows the rings in a rat's tooth when a horizontal slice is placed under a microscope. The four dark rings in the D 2 area show the effect on the dentin of four injections of fluoride. D1 and D3 are dentin areas before and after the fluoride injections. The daily growth rings normal for the rat, are faintly distinguishable in the D3 area. It is evident that such rings bear a



Tooth Rings

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TIMELY Topics

Radio Programs—Every Wednesday from 2:00 to 2:30 P.M. (E.S.T.) the American Medical Association is presenting a dramatized health message over the Red network of N.B.C. It is intended to supplement health teaching in junior and senior high schools. "Diet" is the theme for December and "Milk from Farm to Table" is the topic for December 29.

Museum of Hygiene—An International Health Congress is to be held during the New York World's Fair in 1939 under the auspices of the National Health Council and a Fair Committee headed by Dr. Louis I. Dublin. Noted medical specialists and public health authorities visiting the Fair from many countries will be asked to deliver addresses on health subjects related to Fair exhibits and of interest to professional groups as well as laymen. Subsequently, it is hoped to establish a permanent American Museum of Hygiene similar to the German Hygiene Museum in Dresden.

Health Emphasized—Health education received a real impetus recently when the Executive Committee of the Home Economics Association passed resolutions urging school administrators to use nutrition-trained personnel in their school systems.

The Association points out the fact that since health education in schools is a cooperative project, home economics teachers should participate in those phases of health education in which they are best qualified to give instruction.

Likewise, it was urged that the school lunchroom be supervised by trained persons and on a professional rather than a commercial basis.

A PRACTICAL PLAN

By Irene Tracy, Dietitian
Alfred Plant Junior High School
West Hartford, Connecticut

When I started eight years ago to manage the Alfred Plant Junior High School Cafeteria, we had no thought of a health program. We prepared a varied menu and allowed the pupil to choose what he wished. Today, as a result of friendly informal discussions with students during lunch hour regarding desirable lunch choices and their food preferences, gradually our menu has changed. Although still offering the more expensive meat dinner, we have introduced a vegetable or salad plate for ten cents. To accommodate pupils bringing lunches, a wagon is set up where milk, soup or cocoa and fruit are sold as supplements.

We are working toward the integration of classes to teach good food habits. With the consent of our superintendent and principal, we have been able to ask the science class to conduct a white rat experiment to prove the value of milk. The hygiene classes make posters of balanced lunches using the cafeteria menus as a guide. They are also keeping a record of their heights and weights to try to improve them by the end of the year. An English class conducted a nutrition project and at a tea for the mothers a representative of the class gave a short talk on what the class had collected.

Food Habits Changed

In checking the trays as they passed the cashier's desk, I noticed that a number of the pupils, and especially ninth grade girls, chose dessert and candy for their lunches. In an after school interview with them, they argued that at home it was necessary to eat what they were supposed to, so that at noon they felt it would not matter if they ate what they liked, with no restrictions. A few days later I was fortunate to be near some of them expressing pity for the caged "no milk rat." It was an opportunity to express my pity for the "no milk girls." The point was very obvious. I have since observed their trays are apt to have a salad or milk, sometimes both. Our records show that the sale of the protective foods has increased.

We feel we are gradually attaining our goal of making our students health conscious, and are working on the belief that if you instill good food habits into their early consciousness it will carry through their adult lives.

DID YOU KNOW ?

—that the Milk Bars which have become so tremendously popular in England in the past few years originated over 200 years ago, as stalls in St. James Park, London? The patient cow stood near, to provide milk for the customers.

—that ice cream sodas were first introduced at the Philadelphia Centennial in 1876, and the first ice cream cones were sold in 1904 at the St. Louis World's Fair?

—that if the total amount of milk used in the U. S. in 1936 for making butter were put in 10-gallon cans and these placed side by side in a row, they would extend more than four times around the earth at the equator?

—that in 1928 the French dedicated a statue to Jeanne Harel, reputed to have invented Camembert cheese in 1791?

—that this year marks the 53rd anniversary of the glass milk bottle? The inventor, a New York doctor, had some difficulty in introducing the flint glass bottle with glass cover and heavy nickel-plated closing bail.

—that two milkmen were recently awarded gold Pasteur medals for the valor they displayed in fighting their way through blizzards, last winter, to get milk to a children's hospital in Milwaukee?

—that vitamins are essential to plants as well as humans? Recent work shows that vitamins B and C increase the growth of seedlings when added to their artificial food supply.

—that the name "Junket" has its origin in the olden days in England, when men would go on pleasure trips to London at the expense of the public? These trips were called "junkets," and a great delicacy known as junket, or curds and whey, was always eaten.

THINGS YOU'LL LIKE TO READ

NUTRITION WORK WITH CHILDREN—by Lydia J. Roberts, Ph.D. Revised and enlarged ed. 1935. Chicago: The University of Chicago Press. Pp. 639. Price $4.00.

This book brings together and interprets for students of university level, as well as for teachers and workers in the public health field, the principles of nutrition as they apply to the betterment of child health. The latter part of the book deals with the nutrition program in the school—how it is planned, what it includes and how it functions. Specific suggestions are made at every point and all persons in any phase of health and nutrition work will find this book invaluable.

WAISTLINES—by W. W. Bauer, M. D. 1937. Boston: John Hancock Mutual Life Insurance Company. Pp. 20. Free.

Longer life lines go with shorter waistlines and shorter waistlines go with suitable calorie intake. Having made this point, the author develops the theme that a safe reducing diet supplies all the dietary essentials in sufficient amounts to maintain health. Sample menus for one day contain a full glass of milk at each meal.

THE RELATION OF NUTRITION TO HEALTH, AGRICULTURE AND ECONOMIC POLICY—Final Report of Mixed Committee, League of Nations, 1937. New York: Columbia University Press. Pp. 327. Price $2.00.

This report traces the changes in food consumption habits which have occurred in recent years and concludes that despite the fact that consumption habits have been tending in the desired direction, malnutrition is still a serious problem in all countries. The use of greater quantities of milk and other protective foods is strongly urged.

MENUS AND RECIPES FOR LUNCHES AT SCHOOL—by Rowena S. Carpenter et al. Miscellaneous Publication No. 246 (Bureau of Home Economics) 1936. Obtain from Supt. of Documents, Washington, D. C. Pp. 25. Price 10 cents.

Suggestions for planning and preparing simple noon meals for school age and nursery school children. Quantity recipes are included for both groups.

RELATION OF NUTRITION TO DEVELOPMENT OF SOUND TEETH—by E. N. Todhunter and B. L. Sparling. State College of Washington, Pullman, College of Home Economics, 1937. Mimeographed, 20 Pp. Price 15 cents.

This vauable compilation consists of a summary of the latest information on the relation of nutrition to teeth and a bibliography including 98 references to current literature on the subject.

A SCIENTIFIC STUDY

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marked similarity to tree rings.

If certain glands do not function properly, or if the diet is lacking in vitamin A, C, or D, there are definite and characteristic changes in these tooth rings. One special tooth ring called the neonatal ring is formed at birth—a sort of birth certificate on the teeth. This birth ring appears in the portion of the baby teeth that was forming at the time of birth and makes it possible to compare the amount and quality of the tooth before and after birth. Tooth rings present possibilities of acquiring new knowledge of the vital processes and changes of life and growth.

Diet is an Important Factor in the Prevention and Control of Dental Caries

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other dairy products as well as eggs, fruits, and vegetables, with some certain source of vitamin D provided the year round, and with less sugar and other highly refined foods than are commonly consumed.

There is abundant evidence, not only from human and animal experimentation but from whole populations of countries and communities that dental conditions are closely related to the type of diet eaten. And even though we do not as yet know all that we eventually shall about what constitutes the ideal diet in all particulars, if the best that we now do know could but be applied continuously throughout life, especially during the development period, we should reap a rich reward in the way of a greatly improved generation of children and adults, and this improvement would be especially marked in respect to the teeth.

Note—References to all items mentioned in **Nutrition News** may be obtained on request from the National Dairy Council, 111 North Canal Street Chicago, Illinois.